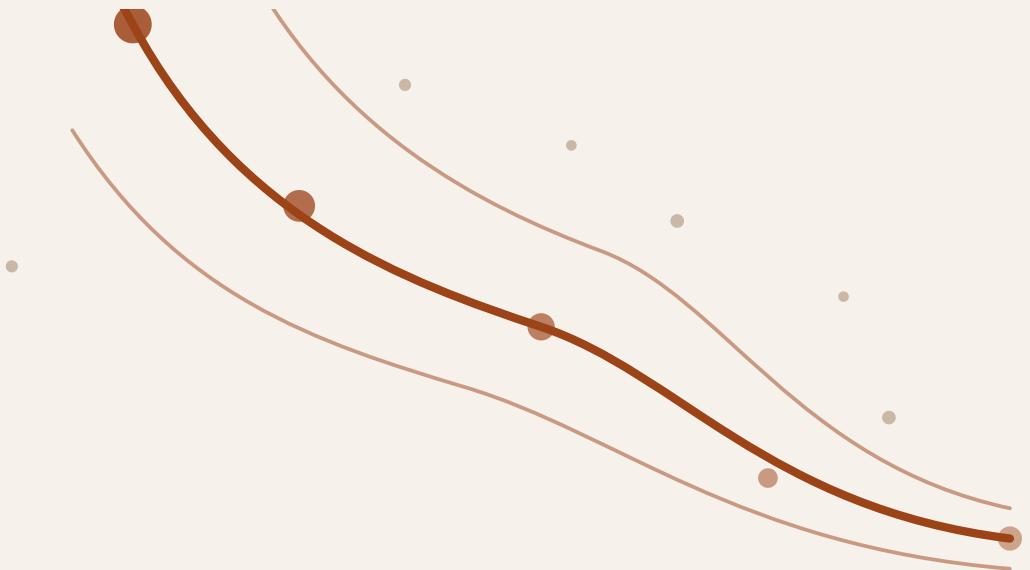


Innovation Management

From scattered initiatives
to a sustained organizational capability

Dr. Omar A. Alsamani



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Chapter 19 Responsible innovation

In this chapter we turn to the most neglected side of innovation management: its effect on those who were never asked about it. We propose a framework that builds responsibility into the initiative journey, and from there move on to the ethics of experimenting on people, the governance of data and artificial intelligence, fairness in the ownership of ideas, and the environmental impact of innovation.

Introduction

Opening case: a reporting app (composite case)

A city launched an app that automatically detects road defects from residents' phones while they drive and ranks maintenance work by the number of reports from each neighborhood. The app looked like a clear success: thousands of reports, faster response, and lower costs than field inspections. A year later, an engineer noticed that maintenance had become concentrated in newer, higher-income neighborhoods, while it had declined in older ones. The reason was that residents of the older neighborhoods,

many of them elderly, used the app less. The app had redistributed the service without anyone deciding that it should.

There was no intended injustice in this case. The app was designed in good faith and succeeded on every measure applied to it. Yet the measure itself, the number of reports, reflected who used the app, while those who needed maintenance remained outside the picture. This paradox is our starting point for the question that occupies this chapter: how can responsibility be built into innovation management as part of its quality?

Learning Objectives

After studying this chapter, the reader should be able to:

- 1 Explain why innovations produce unintended consequences, and why these are hard to control once the innovations have spread.
- 2 Apply the four dimensions of responsible innovation to an initiative in their own organization.
- 3 Apply the core ethical principles when designing experiments involving people.
- ε Recognize the risks of data and artificial intelligence in innovation initiatives, and the frameworks for governing them.
- 0 Design a fair policy for the ownership and attribution of ideas.
- 1 Evaluate the environmental impact of an innovation initiative and identify the level of sustainability-oriented innovation to which it belongs.

19.1**Why is responsibility part of innovation management?**

As early as the 1930s, the sociologist Merton pointed out that every purposive social action produces consequences its actor did not intend, owing to incomplete knowledge, errors of judgment, and a focus on immediate rather than distant results (Merton, 1936). Innovation, by its very nature, is action in unknown territory, so its unintended consequences are all the more likely.

One of the clearest examples is what Obermeyer and colleagues uncovered in an algorithm widely used in the US health system to identify patients in need of additional care. The algorithm used past treatment costs as a proxy measure for health need, and because less was spent on treating Black patients, for reasons related to access to care, it underestimated their need. The researchers found that correcting the measure would have raised the share of Black patients receiving additional care from about 18 percent to about 46 percent (Obermeyer et al., 2019). This case is another illustration of the point made in Chapter 16 that an indicator can swallow the goal: a proxy measure carries assumptions that those who use it may not see.

Anyone who wants to control these consequences faces a dilemma formulated by Collingridge. In the early stages, an innovation is easy to change, but its consequences are not yet known. In the later stages, its consequences are clear, but changing it becomes difficult and costly because it has spread and interests and systems have become tied to it (Collingridge, 1980). Figure 19.1 illustrates this dilemma.

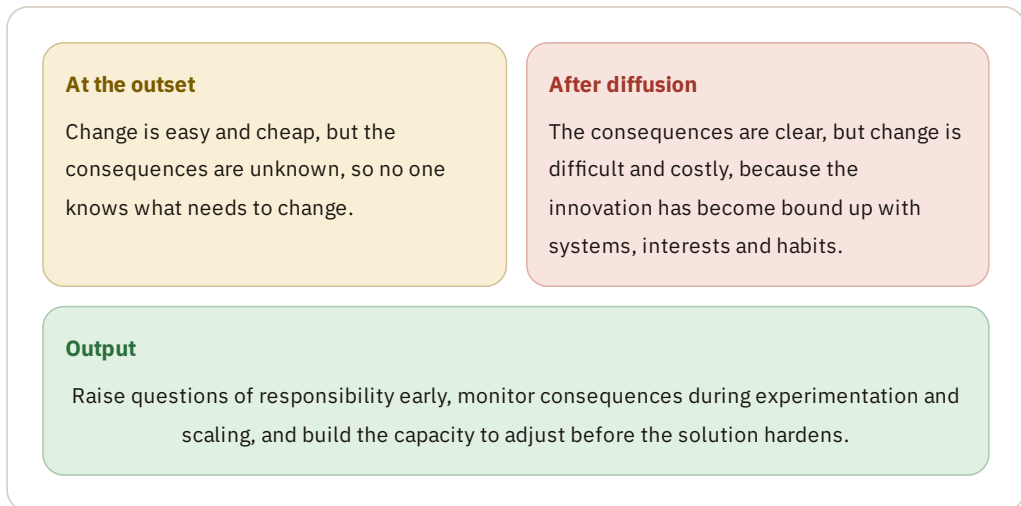


Figure 19.1 The dilemma of controlling innovation, adapted from Collingridge (1980).

This dilemma mirrors the cost-of-change curve presented in Chapter 17: responsibility, like learning, is cheaper at the start. That is why Chapter 12 added the responsibility lens to the lenses for evaluating a solution, so that its questions are raised from the very first concept.

19.2 Dimensions of responsible innovation

Stilgoe, Owen and Macnaghten proposed a framework for **responsible innovation** built on four dimensions that are practiced during the innovation process itself (Stilgoe et al., 2013). Figure 19.2 presents them together with the question each one raises.

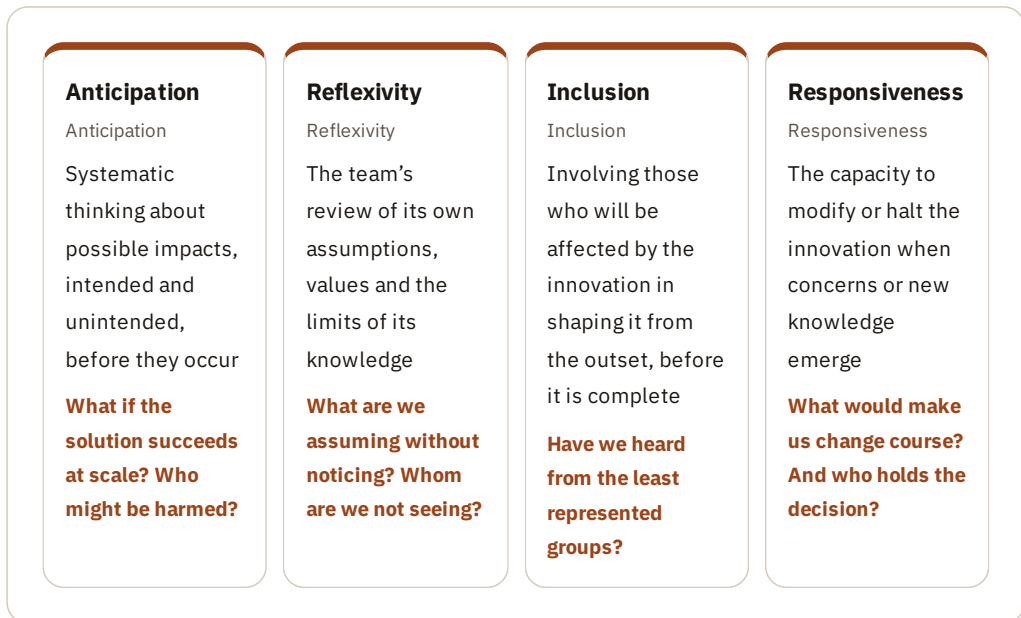


Figure 19.2 The four dimensions of responsible innovation, adapted from Stilgöe et al. (2013).

These dimensions are consistent with what the book has built in earlier chapters. Inclusion extends the understanding of those who live the problem in Chapter 11; responsiveness extends the stopping criteria in Chapters 10 and 14; and reflexivity, that is, critical review of oneself and one's assumptions, extends the discussion in Chapter 8 of the psychological safety that allows a team to admit what it does not know. Responsible innovation is simply good innovation management, with a wider circle of people it cares about.

In the opening case, the anticipation question alone would have been enough to reveal the problem: who does not use the app, and do they need maintenance any less than others? Inclusion would have added an alternative reporting channel, such as a phone line or a neighborhood monitor, along with regular field inspections of the neighborhoods where use was lowest.

19.3

The ethics of experimenting on people

Chapter 14 called for experimentation before scaling and cautioned that the beneficiary of a public service is not a test subject. The balance between the two rests on well-established ethical principles for research involving human beings. The Belmont Report set out three basic principles (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979):

- **Respect for persons:** people are treated as the decision-makers in matters that concern them, so they know what is being tested on them and consent to it whenever possible, and groups less able to protect themselves receive special protection.
- **Beneficence and non-maleficence:** risks are minimized and benefits maximized, and no one is exposed to harm that the value of what is learned cannot justify.
- **Justice:** the burdens and benefits of an experiment are distributed fairly, so that no particular group bears the risks of experimentation while others benefit from its results.

In innovation experiments, these principles translate into practical questions. Do participants know they are in an experiment? Can they withdraw without losing the service? Are there stopping conditions if harm appears? Was the participating group chosen because it is best suited for learning, or because it is least able to object? In universities, research involving human beings passes through research ethics committees, and it is advisable to apply the same principles to student projects that test solutions with real beneficiaries.

In Practice

Before any experiment with beneficiaries, ask yourself: if I, or a member of my family, were in the group to be experimented on, what would I want to know in advance? And what would I want guaranteed? Write down the answer and make it part of the experiment card.

19.4

Data and artificial intelligence

Many innovation initiatives today depend on personal data and on artificial intelligence, both of which are sources of great value and of great risk alike. The Kingdom has established a legal framework for protecting personal data with the issuance of the Personal Data Protection Law (Personal Data Protection Law, 2021 [Arabic]), and the Saudi Data and AI Authority (SDAIA) has published AI ethics principles intended to guide the development and use of AI in ways that safeguard rights and strengthen trust (Saudi Data and AI Authority, 2023 [Arabic]). Internationally, these frameworks intersect with the OECD AI Principles, which emphasize values such as respect for human rights and fairness, transparency and explainability, robustness and safety, and accountability (OECD, 2019).

Compliance with these frameworks does not remove the need for questions the innovation team must ask itself, the most important of which are:

- **What do the data actually represent?** The report data in the opening case, and the cost data in Obermeyer's algorithm, represented something other than what they were assumed to represent.
- **Who is missing from the data?** Groups that use technology less, or appear less in records, may be excluded without anyone noticing.
- **Can the decision be explained?** A decision that affects people, and that those who made it cannot explain, is hard to defend and hard to correct.
- **Where does the human remain in the decision?** Artificial intelligence supports human judgment, but accountability remains with a specific person.

This section returns us to a thesis presented in Chapter 2: that artificial intelligence raises the value of the human rather than eliminating it. The larger the share of work that tools take on, the more important human judgment becomes in determining what they should do, for whom, and at what cost.

19.5 Intellectual property and fairness to idea holders

Innovation management raises questions about the ownership of ideas and solutions. Who owns an employee's idea that the organization has developed? Who owns a student project that originated in a course or a university laboratory? What share of the value of an innovation goes to the innovator? Uncertainty about the answers harms both sides: innovators who do not know their rights may withhold their ideas or take them where they will be protected, and an organization that has not defined its policy faces disputes once an idea succeeds.

Fairness here requires a clear policy, announced in advance, that specifies what the organization owns, what remains with the innovator, how any returns are to be shared, and how credit is attributed. This connects directly with the discussion in Chapter 10 of procedural justice and attributing an idea to its originator, and with the discussion in Chapter 7 of recognition as one of the innovator's foremost needs. In universities in particular, such a policy needs to be understandable to students and to encourage them to develop their ideas within the university's own ecosystem.

Intellectual property also bears on the open innovation discussed in Chapter 18: an organization that makes its data available or collaborates with partners needs clear rules on what is shared, what is protected, and how individuals' privacy is preserved in the data it releases.

19.6 Environmental impact: sustainability-oriented innovation

The question of responsibility extends to innovation's impact on the environment, one of its longest-lasting effects and the hardest to reverse. Adams and colleagues defined **sustainability-oriented innovation** as making intentional changes to an organization's philosophy and values, as well as to

its products, processes and practices, in order to create environmental and social value alongside economic value. From a systematic review of 127 sources, they derived three contexts through which such innovation progresses (Adams et al., 2016):

- **Operational optimization:** the organization does what it already does with greater environmental efficiency, for example by reducing energy and material consumption and waste in its operations.
- **Organizational transformation:** the organization offers new products, services or business models that create environmental or social value, accompanied by a change in its values and way of thinking.
- **Systems building:** the organization works with partners beyond its boundaries to change an entire system, such as a city's transport or waste management system.

This progression is especially useful for public sector organizations and universities. Digitizing a service so that beneficiaries no longer need to travel or use paper is an operational optimization with a direct environmental effect. Redesigning a service around the principle of sharing resources rather than owning them is an organizational transformation. Tackling an environmental problem in the region in partnership with other bodies is systems building, the level that connects with open innovation. The Kingdom has made environmental sustainability and essential needs one of its four national research, development and innovation priorities (Saudi Press Agency, 2022 [Arabic]), so environmental impact has become a question put to initiatives from the outset, where it was once left until after implementation.

Principle

Responsible innovation is good innovation management with a wider circle of concern: those who use the solution, those who do not, and those affected by it without ever being asked.

Chapter tool: the responsibility check across the initiative journey

Add these questions to the gates of your organization's innovation system, so that the team answers them at each stage as far as available knowledge allows. Their value lies in the discussion they open, more than in completing a formal compliance checklist.

Chapter tool The responsibility check across the initiative journey

Stage	Responsibility questions
Understanding the problem	Who lives the problem? Which groups are least represented in it? Have we heard from them directly?
Developing the solution	Who might be harmed if the solution succeeds? Which proxy measures are we relying on, and what do they actually represent?
Experiment	Do participants know they are in an experiment? Can they withdraw? What are the stopping conditions? Have the burdens been distributed fairly?
Data and artificial intelligence	Are we complying with the Personal Data Protection Law? Who is missing from the data? Can the decision be explained? Who is accountable for it?
Environmental impact	What is the solution's effect on energy and material consumption and waste? Could it create environmental value alongside its core value?
Scaling	Did we monitor unintended consequences during the experiment? Do we still have the capacity to adjust after scaling?
Ownership and fairness	Does the idea holder know their rights? Have they been given credit? Are the rules public to all parties?

Chapter Summary

- Every purposive action has consequences its actor did not intend, and innovation is especially prone to them because it takes place in unexplored territory.
- Proxy measures may carry assumptions that disadvantage groups absent from the data, without anyone intending it.
- Early on, an innovation is easy to change but its consequences are unknown; once it has spread, its consequences are known but it is hard to change. The way out is to raise questions of responsibility early and to monitor consequences continuously.
- Responsible innovation has four dimensions: anticipation, reflexivity, inclusion and responsiveness. In essence, they are an extension of good innovation management.
- Experimenting on people rests on respect for persons, beneficence and non-maleficence, and justice in the distribution of burdens and benefits.
- Data and AI initiatives require compliance with regulations, along with questions about what the data represent, who is missing from them, explainability, and keeping a human accountable.
- A clear, published policy on the ownership and attribution of ideas is part of being fair to their originators, and part of the organization's ability to retain them.
- Sustainability-oriented innovation progresses from operational optimization, to organizational transformation, to systems building with partners, and environmental impact is a question to be raised from the start of an initiative.

Key Terms

Responsible innovation Responsible innovation	Taking care of the future through collective stewardship of science and innovation in the present, based on anticipation, reflexivity, inclusion and responsiveness.
Unintended consequences Unintended consequences	Outcomes of a purposive action that its actor neither intended nor foresaw.
Collingridge dilemma Collingridge dilemma	The difficulty of controlling innovation: it is easy to change while its consequences are unknown, and hard to change once they become clear.
Proxy measure Proxy measure	A measure used in place of the intended quantity because the latter is hard to measure directly; it may carry hidden biases.
Sustainability-oriented innovation Sustainability-oriented innovation	Intentional changes to an organization's values, products and processes that create environmental and social value alongside economic value.
Explainability Explainability	The ability of those who use an automated system to explain the reasons behind its decisions.

Review and Discussion Questions

- 1 Why is it hard to control the consequences of an innovation once it has spread? How does this relate to the cost-of-change curve? Understanding
- 2 Apply the four dimensions of responsible innovation to an initiative you are working on, and identify the one least present. Application
- 1 Analyze the opening case and the health-care algorithm case using the concept of a proxy measure, and identify what the two have in common. Analysis
- 2 Design a brief policy on the ownership of students' ideas and projects at your university or educational institution. Application
- 3 Classify three initiatives in your organization according to the three contexts of sustainability-oriented innovation, and suggest how one of them could move up to the next level. Application
- 4 "Responsible innovation slows innovation down and constrains it." Evaluate this statement. Evaluation

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How does an organization move from scattered initiatives that celebrate innovation to a sustained capability to produce it?

This book traces the path of innovation from the first signal to a solution adopted in practice that creates value, and analyzes the organizational foundations that make this path a settled practice: strategy, systems, culture, governance, teams and measurement, with people at the center.

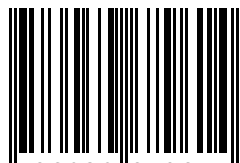
It rests on three pillars: a clear, high-priority problem; motivated people whose needs are met; and a system that connects them and turns effort into repeatable results. It combines international research evidence with the Saudi context, and pairs each chapter with a tool that can be used in a real organization.

Its twenty chapters are organized in five parts: foundations; institutional foundations and people; the initiative journey; value and the ecosystem; and an application to the university innovation ecosystem.

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